REMARKS/ARGUMENTS

In the Office action mailed September 22, 2004, claims 1-48, 58 and 60 were examined. It is noted that the Office action Summary also indicates that claims 49-54 were rejected, though this appears to be a typographical error. The Examiner is thanked for attention to the application.

Claims 24-31, 33, 47, 49-57 and 61-62 are now canceled. Claims 12, 18, 32, 34, 45, 46, and 58 are amended. Claims 1, 4-6, 8-23, 32, 34-40, 43-46, 48, 58 and 60 remain in the application.

The Office action indicates that claims 1-11 are allowed. Office action, page 11. As claims 2, 3, 7 have already been canceled, it is assumed that for convenience the Office action indicates that claims 1-11 are allowed when actually claims 1, 4, 5, 6, and 8-11 are allowed.

Claims 12-23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,529,542 ("Karlsen") over U.S. Patent No. 5,163,058 ("Farries") in view of U.S. Patent No. 5,379,310 ("Papen").

Claim 12 specifies "an array of single wavelength lasers on a semiconductor substrate, each laser emitting light at a specific wavelength as determined by dimensional variables of each laser".

Karlsen discusses with the use of external cavity lasers. Karlsen, col. 1, lines 31-32. ("In an IBC laser, an external cavity is used…"). "AR coating 107 insures that the external cavity rather than the cleaved facets of the gain elements set the lasing wavelength." Karlsen, col. 3, lines 14-16. "The

optical cavity is formed by the combination of high reflectance coating 105 and an external output coupler 109". Karlsen, col. 3, lines 16-18. Although this portion of Karlsen discusses a prior art system of FIG. 1, the system of FIG. 2 of Karlsen "is the same as system 100 except for the inclusion of a lens or lens array 201." Karlsen, col. 4, lines 21-22. Thus, Karlsen does not disclose or suggest "an array of single wavelength lasers on a semiconductor substrate, each laser emitting light at a specific wavelength as determined by dimensional variables of each laser", as specified in claim 12.

Similarly, in Farries, "[t]he laser cavity is formed by the back facet of the array 11 and the reflector in the external cavity." Farries, col. 2, lines 56-58.

> A dispersive element, which is preferably a diffraction grating 14, is placed in the cavity such that the feedback from the reflector to each laser element is at a different but well defined wavelength. In such a configuration each element of the laser array 11 will oscillate at a different wavelength which is determined by the position of the reflector, the diffraction and position of the grating 14 and also the position and power of the lens 15.

Farries, col. 2, lines 58-66. Thus, Farries does not disclose or suggest "an array of single wavelength lasers on a semiconductor substrate, each laser emitting light at a specific wavelength as determined by dimensional variables of each laser", as specified by claim 12.

In Papen, "[t]he laser diode array 12 is coupled to an external laser cavity containing a diffraction grating 16 and a

curved mirror 18." Papen, col. 4, lines 57-60. "The mirror 18 provides feedback into the diode array 12. This causes each diode in the array to laze in a specific cavity mode." Papen, col. 4, lines 64-66. See also Papen, col. 4, lines 18-20 ("The dispersive element 16 and the reflector 18 form an external cavity which causes sources 12a-12n to lase at predetermined wavelengths λa - λn.") "[W]avelength tuning may be accomplished by moving diode array 12 (and collimating optics) with respect to the mirror 18 and the grating 16. Papen, col. 6, lines 16-19. "As the diode array moves, the resonance condition for each diode changes 12a-12n and thus the lasing wavelength of each diode changes." Papen, col. 6, lines 19-21. Thus, Papen does not disclose or suggest "an array of single wavelength lasers on a semiconductor substrate, each laser emitting light at a specific", as specified in claim 12.

Claim 12, and dependent claims 13-17, are therefore allowable.

In addition, the mirrors of Papen, Karlsen, and Farries identified by the Office action appear to be diffractive gratings. It is respectfully noted that diffraction gratings and mirrors are recognized to the separate devices in the relevant art. As an example, definitions for "diffraction grating" and "mirror" are provided as Exhibits A and B hereto, with the definitions being found in a dictionary provided by www.photonics.com. In addition, it is respectfully noted that diffraction gratings are classified by the United States Patent and Trademark Office as 359:566, while mirrors and reflectors are specified in classification 359/838+. Thus, it would appear

that common usage and the USPTO recognize a difference between mirrors and diffraction gratings.

Claim 12, and dependent claims 13-17, are therefore further allowable.

Claim 18 similarly specifies "an array of single wavelength lasers on a semiconductor substrate, each laser emitting light at a specific wavelength as determined by dimensional variables of each laser" and "a mirror positionable to reflect light at normal incidence".

Claim 18 is rejected on the same basis as claim 12. The comments regarding the rejection of claim 12 apply also to claim 18. Accordingly, claim 18 is allowable, as are dependent claims 19-23.

Claim 32 is rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,236,666 ("Mirov") in view of U.S. Patent No. 5,220,463 ("Edelstein").

Claim 32 specifies that "the optical element is movable in a direction substantially perpendicular to the array of lasers". The Office action states that Edelstein discloses an optical device including a prism 14 which is moveable. In Edelstein a "change in delay time is created by moving one of the retroreflectors, relative to the other. For example, in accordance with a preferred aspect of the invention, retroreflector 14 is moved along its optical axis as shown by double headed arrow 32 in FIG. 1." Edelstein, col. 3, lines 43-48. The direction of movement of the retroreflector is therefore parallel to the direction of the input beam. This may also be seen in FIG. 3 of Edelstein, in which "[m]oveable retroreflector 14 is mounted on one end of a slide rail 40 that

is mounted for reciprocating movement in slide support 42." Edelstein, col. 4, lines 16-19. Thus, Edelstein does not teach a moveable optical element in perpendicular direction to the laser array, and combining same with the disclosure of Mirov would not arrive at the claimed invention. Accordingly, claim 32 is allowable, as are dependent claims 34-39 and 46..

Claim 40 is rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,236,666 ("Mirov") in view of U.S. Patent No. 5,220,463 ("Edelstein").

Claim 40 similarly specifies that a "first mirror is translatable in a first direction; and wherein the first direction is substantially perpendicular to the array of lasers." As discussed above, Edelstein does not discuss such and claim 40 is allowable, as are dependent claims 43 and 44.

In addition, it appears that the Office action indicates that a platform is rotatable, varyingly in Mirov or Edelstein. It does not appear that Mirov includes a moveable platform. In Edelstein, a cam 56 is rotatable. However, "[t]he retroreflector 14 should be rigidly attached to the end of the rail." Edelstein, col. 4, lines 22-23. "As cam 56 rotates, the cam reels the slide in from both directions, minimizing slip and backlash. The slide displacement is linearly related to the angle through which the output shaft moves in proportion to the cam radius." Edelstein, col. 4, lines 48-51. Accordingly, in Edelstein a cam is used to linearly translate a slide parallel to the axis of the input beam. As the slide moves in a linear fashion, and does so in the direction parallel to the direction of the input beam, there is no movement perpendicular to an

array of lasers. Accordingly, claim 40 is further allowable, as are dependent claims 43 and 44.

Claim 45 has been amended to specify a first mirror and a second mirror, the first mirror having a fixed position relative to the array of lasers and a second mirror moveable to couple light reflected by the first mirror to the lens. Claim 45 has also been amended to specify an array of lenses, each lens in the array of lenses corresponding to each laser in the array of lasers.

Claim 45 is rejected under 35 U.S.C. §102(b) as being anticipated by Mirov or Lang. However, neither Mirov or Lang appear to disclose or suggest the moveable mirror and array of lenses as specified in claim 45. Accordingly, claim 45 is allowable, as is dependent claim 48.

Claim 58 is rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,773,345 ("Ota") in view of Papen. Claim 58, as amended, specifies "an array of single wavelength lasers...each laser emitting light at a specific wavelength as determined by a grating fabricated within each laser."

In Ota, however,

> When current is first fed to the 'semiconductor laser amplifier', the 'semiconductor laser amplifier' emits 'spontaneous emission light'. This light, like the LED light, is incoherent light of a broad spectrum. Of the spontaneous emission light, the light of a specific wavelength is selectively picked up by a spectral optical system. The selected light is returned to the semiconductor laser amplifier by way

> of an optical route of 'optical waveguide'→reflecting means→'optical waveguide'→spectral optical system. Only the selected light of the specific wavelength is amplified and travels through 'semiconductor laser amplifier'→reflecting means→'semiconductor laser amplifier'→.... Finally, a laser oscillation takes place.

Ota, col. 4, lines 26-38.

"As shown in FIG. 18, the external resonator of such conventional example described in the above publication includes a collimator lens 51, a diffraction grating 52, and a highly reflective coating 53a formed on an end surface of an optical fiber 53, and an external oscillator." Ota, col. 4, lines 42-46. "The reflected laser beams return to the lasers LD_1 to LD_3 following the reverse path. The laser beams returning to the respective lasers have wavelengths λ_1 to λ_2 satisfying both predetermined angles θ_1 to θ_3 corresponding to the lasers LD_1 to LD_3 and a diffractive condition $d \sin \theta_i = n\lambda_i$ (where d is the distance between lines of the diffraction grating, and n is an integer). Therefore, individual semiconductor lasers LD_1 to LD_3 come to emit light at the corresponding predetermined wavelengths λ_1 to λ_3." Ota, col. 4, lines 56-64.

Accordingly, Ota does not disclose or suggest "an array of single wavelength lasers...each laser emitting light at a specific wavelength as determined by a grating fabricated within each laser" in the context of the invention claimed in claim 56. The discussion of Papen with respect to claim 12 also indicates that Papen does not disclose or suggest "an array of single wavelength lasers...each laser emitting light at a specific

wavelength as determined by a grating fabricated within each laser" in the context of the invention claimed in claim 56. Similar comments also apply to Karlsen and Farries.

Accordingly, claim 56 is allowable, as is dependent claim 60.

The application is now believed to be allowable and allowance of same is respectfully requested.

In addition, an Information Disclosure Statement (IDS) was filed on February 28, 2003. A copy of the IDS, the accompanying Substitute Form 1449, and return receipt postcards are attached hereto.

It is respectfully requested that the listed references be considered in the examination of this application and identified on the list of references cited on the patent issuing for this application. Applicant also requests that an initialed copy of FORM PTO/SB/08A/B be entered in the application file and returned to applicant with the next communication from the Office in accordance with MPEP § 609.

Respectfully submitted,

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